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Foundation Publications

Foundational GeneChip Technology Publications

Review key manuscripts describing the fabrication, analysis, and application of GeneChip arrays.

Photolithography

The foundational publications describing the fabrication of microarrays using a photolithographic process are illustrated in the following publications:

- Fodor S.P., et al. Light-directed, spatially addressable parallel chemical synthesis. *Science*. 1991, **251**(4995):767-73.
- Pease A.C., et al. Light-generated oligonucleotide arrays for rapid DNA sequence analysis. *Proc Natl Acad Sci U S A*. 1994, **91**(11):5022-6.
- Fodor S.P., et al. Multiplexed biochemical assays with biological chips. *Nature*. 1993, **364**(6437):555-6.

Expression Analysis with GeneChip Arrays

Expression analysis using Affymetrix microarrays was first described in a study of gene expression after induction of cytokine in mouse lymphocyte:

- Lockhart D.J., et al. Expression monitoring by hybridization to high-density oligonucleotide arrays. *Nat Biotechnol*. 1996, **14**(13):1675-80.
- Subsequent publications further demonstrated that Affymetrix microarrays are well suited for this task:
- Golub, T. R., et al. Molecular classification of cancer: class discovery and class prediction by gene expression monitoring. *Science*. 1999, **286**(5439), 531-7.
- Winzeler, E. A. et al. Functional characterization of the *S. cerevisiae* genome by gene deletion and parallel analysis. *Science*. 1999, **285**(5429), 901-6.

DNA Analysis with GeneChip Arrays

The fundamentals of DNA sequence analysis using Affymetrix microarrays can be found in the following review article:

- Lipshutz, R.F. et al. Advanced DNA sequencing technologies. *Curr Opinion in Structural Biology*. 1994, 4:376-380.

Some of the early applications of Affymetrix microarrays to detect SNPs have been cited for genes including HIV-1 in Kozal, et al. 1996, cystic fibrosis (CFTR) in Cronin, et al. 1996, human mitochondrial sequence in Chee, et al. 1996, and breast cancer in BRCA1 Hacia et al. 1996:

- Kozal, M.J., et al. Extensive polymorphisms observed in HIV-1 clade B protease gene using high-density oligonucleotide arrays. *Nat Med*. 1996, **2**(7):753-9.
- Cronin, M.T., et al. Cystic fibrosis mutation detection by hybridization to light-generated DNA probe arrays. *Hum Mutat*. 1996, **7**(3):244-55.
- Chee, M., et al. Accessing genetic information with high-density DNA arrays. *Science*. 1996, **274**(5287):610-4.
- Hacia, J.G., et al. Detection of heterozygous mutations in BRCA1 using high density oligonucleotide arrays and two-colour fluorescence analysis. *Nat Genet*. 1996, **14**(4):441-7.

Whole Genome / Chromosome Tiling Arrays

- Kapranov, P. et al. Large-scale transcriptional activity in chromosomes 21 and 22. *Science*. 2002, **296**(5569), 916-9.

Software and Informatics

- The Microarray Suite 5.0 statistical algorithm is presented in Liu, et al. 2002 and in Hubbell, et al. 2002.
- Liu, W.M., et al. Analysis of high density expression microarrays with signed-rank call algorithms. *Bioinformatics*. 2002, **18**(12):1593-9.
- Hubbell, E., et al. Robust estimators for expression analysis. *Bioinformatics*. 2002, **18**(12):1585-92.

The url for the NetAffx Analysis Center is <http://www.affymetrix.com/analysis/index.affx> and a description of the annotations and the software system can be found in Liu, et al. 2003.

- Liu, G., NetAffx: Affymetrix probesets and annotations. *Nucleic Acids Res*. 2003, **31**(1):82-6.

Additional Resources

Many other publications by Affymetrix scientists and microarray researchers around the world can be found in our searchable [Database of Scientific Publications](#). Affymetrix continues to generate new publications on the latest applications of GeneChip technology through a continued commitment to molecular biology and related technology.

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